

Water Reuse and Recycling: Status and Forecast

Presented to:
Western States Water Council
Legal and Water Quality Committees

July 16, 2009

Presented by:
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WateReuse Association

Topics

- WateReuse Association
- Some Basic Facts
- Water Reuse Trends
- Desalination Activities
- WateReuse Foundation's Research Program
- The Future of Water Reuse & Desalination in the West, the U.S. and Globally
- Conclusions

WateReuse Association *A Trade Association*

Four Strategic Initiatives

- Advocacy -- National & State
 - Obtain Funding for Local Projects---USBR Title XVI
 - Funding Partnerships for Research
 - State Technical Assistance on Regulations
- Research (through WateReuse Foundation)
- Education & Outreach (Publications, Conferences)
- Technical Assistance

Membership

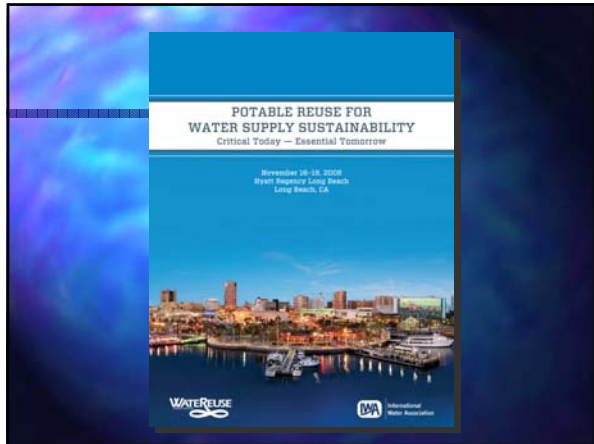
- Evolution from California to National to International Association
- Organizational Membership Totals More than 390
- ~180 Water Agency Members
- Virtually all Major Consulting Engineering Firms (e.g., CH2M Hill, Black & Veatch)
- Many Major Equipment Suppliers (e.g., GE Water, Siemens)
- Membership Growing at Approximately 10%/Year

WateReuse Association *Education & Outreach*

- WateReuse Symposium is Only National Conference Devoted to Reuse
- **24th Annual Symposium -- Seattle -- September 13-16, 2009**
- Research Conference was held in Huntington Beach May 2009
- Research Publications and Newsletters
- **National Database of Water Reuse Facilities** Launched in late 2008

WateReuse Association Products





WateReuse Australia

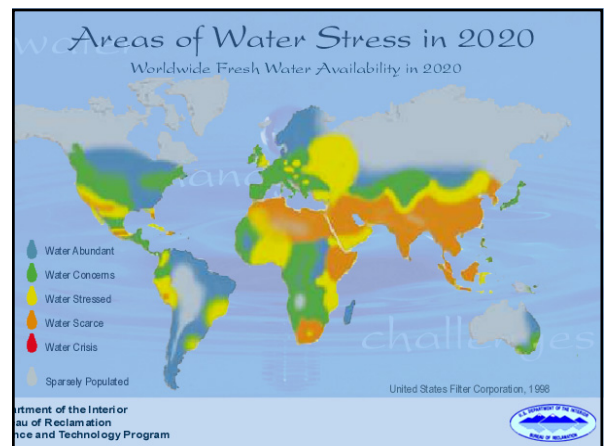
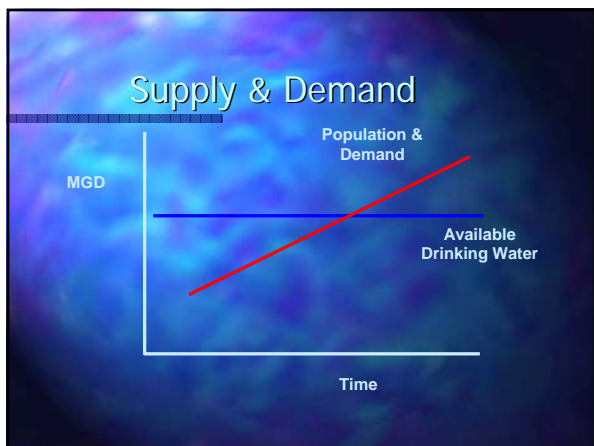
- First International Division of WateReuse
- Formed through an MOU with WSAA
- Focus is on Shared Experiences, Technology Transfer
- Every Three Years, WateReuse will Convene a Specialty Conference in Australia
- Currently Have Five Australian Members
 - Sydney Water
 - Melbourne Water
 - Barwon Water
 - ACTEW Corporation
 - South East Water

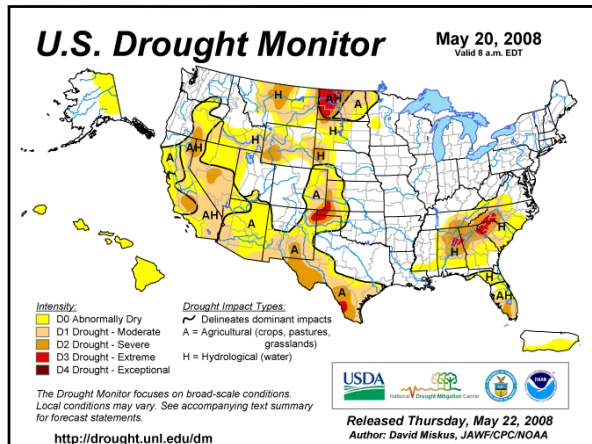
Other WateReuse International Initiatives

- Established International Committee
- Assisted Bureau of Reclamation on Title XVI Guidelines (2007)
- MOU with Singapore PUB
- California Water Recycling Policy adopted Feb. 2009
- Opportunity to work with U.S. Trade & Development Initiative Administration on China
- WateReuse Foundation Partnering with USEPA, AwwaRF, and WERF on a Technical Conference with Japan in Las Vegas in March '09

Why Water Reuse and Recycling?

- *Urban growth*
- *Droughts and Long term shortages*
- *Climate change*





Federal Initiatives

- USBR Title XVI Grant Program ---FY 2009 \$45 and \$135 million Stimulus
- EPA, Army Corps and USDA funding assistance?
- National Academy of Science Comm. on Assessment of Water Reuse as an Approach for Meeting Supply Needs

Some Basic Facts

- All Water is Reused throughout the arid West
- There is Substantial Unplanned Reuse (e.g., the Mississippi River, Thames, Rhine, Seine, etc.)
- Water is a Manufactured Product
- "Purity" of Water Should be Matched to its Intended Use
- Most Western State Water Plans recommend extensive reuse development
- In Planned Water Reuse, we Emulate "Mother Nature" – With Technology, can do it better and faster
- Water reuse is "green" and "eco-friendly"

Factors Driving Water Reuse (and Desalination)

- Drought
- Population growth
- Increased municipal, industrial, and agricultural demand
- Dependence on single source of supply
- TMDLs/Nutrient load caps

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"Water scarcity"

Significant Trends in Water Reuse

- Reuse is Gaining in Prominence Around the Globe (e.g., Australia, Singapore, South Africa, Israel, Spain, Belgium)
- Technology and Research is Global
- Growing Public Acceptance
- All freshwater needs to be reused and recycled to comply with Clean Water Act
- Climate Change and Energy are Significant Emerging Issues
- Progress Being Made Internationally on Indirect Potable Reuse Front

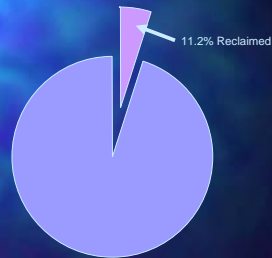
What is Possible with Water Reuse?

- Answer: Virtually Anything Given Current Technology---NASA space technology
- With MF/RO/UV/AOP, Can Produce Water that is Virtually Pure Dihydrogen Monoxide
- Problem is that Technology has Surpassed our Ability to Communicate Effectively with Public
- Need to Resolve Issues with

Potential for Water Reuse

- Approximately 11% of municipal wastewater in the U.S. is reclaimed and beneficially reused (Israel it is over 90%)

About 34.9 bgd Municipal Effluent in the U.S.

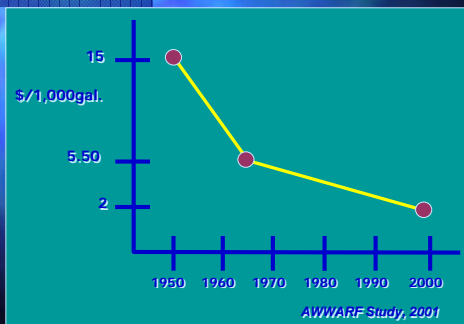


Best Available Technology

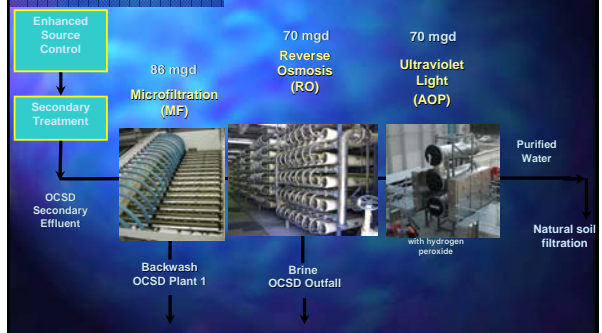
Membranes are the technology of choice around the world today as the "best available technology" for water purification.

- Singapore, Japan, China, Australia, Spain
- Orange County, California
- Tampa Bay, Florida
- Trinidad & Tobago, WI

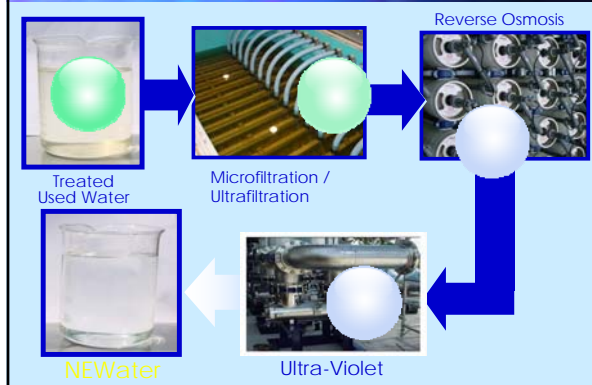
Reverse Osmosis Costs



GWR System (OCWD and OCSD) Advanced Water Treatment Flow Diagram



NEWater Production Process



Desalination Plant - Technology

- Two stage reverse osmosis, supply and blend wells, collector and transmission pipelines, and deep-well injection concentrate disposal system
- At capacity produces 15.5 million gallons per day (mgd) of permeate and 3 mgd of concentrate
- 16 new blend wells produce 12 mgd
- Concentrate injected into porous rock through 3,000-4,000-ft-deep wells
- Total supply 27.5 mgd



Applications

- Landscape Irrigation
- Agricultural Irrigation (Edible & Non-Edible Crops)
- Industrial and Commercial
- Environmental Uses
- Non-Potable Urban Uses (Urinal Flushing in High Rise Buildings)
- Groundwater Recharge
- Potable Water Supply Augmentation---Lake Mead and Sacramento River Delta

Regulations and Criteria

- No Federal Regulations---WateReuse Association technical assistance with experts
- 28 States Have Water Reuse Regulations
- 2004 U.S. EPA Guidelines for Water Reuse:
 - Recommended treatment processes
 - Water quality limits
 - Monitoring frequencies
 - Setback distances
 - Other controls

WateReuse Foundation

Mission Statement

"The mission of the WateReuse Foundation is to conduct and promote applied research on the reuse, reclamation, recycling, and desalination of water."



2008 Solicited Research Projects

- Investigation of Social, Environmental, Natural and other Informational Factors that Influence Judgments and Decisions about Water Reuse
- Approaches to Maintain Consistently High Quality Reclaimed Water in Storage and Distribution Systems
- Use of Ozone in Water Reclamation for Contaminant Oxidation
- Evaluation of Alternatives to Domestic Ion Exchange Water Softeners
- Disinfection Guidelines for Satellite Water Recycling Facilities
- Implications of Future Water Supply Sources on Energy Demands (CEC)

Research Partnerships

- U.S. Bureau of Reclamation
- Global Water Research Coalition
 - Funding *Water Reuse in 2030* jointly with WSAA and Singapore PUB
- CA State Water Resources Control Board
- CA Department of Water Resources, Sandia, AwwaRF on Desalination
- California Energy Commission
- Southwest Florida Water Management District

Conclusions & Future Forecast

Conclusions

- Water Reuse and Recycling will grow quickly in the West
- Desalination technologies with membranes will grow significantly
- State regulations need to be updated
- Federal funding will encourage more reuse and desalination projects in the West

The Future

- Reuse is the most significant new water supply in the West
- Increased Desalination – Primarily Brackish Groundwater but some Seawater
- Recycled Water will likely be mandated in all New Planned Communities
- Technology is Not an Issue
- Concerns About EDCs/PPCPs Will be Addressed with ongoing research at AWWARF, WERF, and WateReuse Research Foundation

Thank you

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